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Exotic species threaten health of Great Lakes

Associated Press

MINNEAPOLIS - Vast populations of foreign creatures have invaded and damaged the Great Lakes in the last few decades, creating a more difficult problem than the industrial contamination that fouled the lakes in the 1960s, the Star Tribune reported in Sunday editions.

The invasion began in the early 1800s, but accelerated after the St. Lawrence Seaway opened the lakes to oceangoing ships in 1959. More than 40 percent of the 179 alien species have been documented since then, with most arriving by ship from Europe or Asia, according to research data analyzed by the newspaper.

A new invader is identified in the lakes about every seven months, faster than scientists can study them.

Henry Regier, a professor emeritus of zoology and environmental studies at the University of Toronto, describes the Great Lakes basin as "a sick system." In 50 years of studying the lakes, he said, he never has seen such dramatic changes.

Professor James Carlton, director of the Maritime Studies Program at Williams College in Mystic, Conn., said the lakes have been permanently modified "on one of the greatest scales in any aquatic environment in the world."

Unlike industrial pollution, much of the new damage is nearly invisible, hidden in the lakes' murky depths. Yet biologists say the evidence is mounting that the unintended introductions of species from around the world could soon dominate the lakes' ecology, the Star Tribune reported.

On the shores of Lake Erie, the destruction can be seen in the deaths of birds who have eaten the round goby, a 4- to 6-inch European fish with bulging eyes that has found a new home in the Great Lakes.

More than 50,000 loons and other birds died after eating gobies over the past five years - victims of poisoning. Scientists say the gobies become toxic food by ingesting quagga mussels, another recent invader from Europe, which accumulate botulinus toxin from the lake bottom.

So many dead birds have washed ashore during recent fall migrations that beach patrols hauled them away with ATVs and flatbed trucks.

A critical link in the Great Links food chain is the quarter-inch Diporeia, a pale orange shrimplike organism that live on lake bottoms. Loaded with fat, they long have been a high-energy, abundant food source for fish in the Great Lakes. But over the past decade, Diporeia have vanished from more than 17,000 square miles of lake bottom - an area more than twice the size of New Jersey. Every lake except Superior has been affected.

Scientists began to document the losses in the early 1990s, in areas where zebra or quagga mussels had

invaded. As the fish food disappeared, so did native fish, especially the commercially valuable whitefish, which depend on Diporeia for up to 70 percent of their diet.

The speed and success of a single species' invasion can be stunning. Scientists found a few dozen Eurasian ruffe in the Duluth harbor in 1986. The small, spiny, perch-like fish from Europe exploded to 2 million by 1991 and to more than 8 million in 1998, before declining slightly, according to federal estimates. It now is the most abundant fish species in the harbor.

One reason some invasive species are surviving and proliferating is that harbors and estuaries are cleaner today. Taxpayers and industries invested billions of dollars to improve sewage treatment, remove phosphorus and reduce chemicals, allowing the Great Lakes and their native fish and wildlife to progress toward recovery during the 1970s and 1980s. Invaders are undercutting those achievements.

The changes affect not only fish, but also the smallest plants, invertebrates, snails and mollusks. For example, 20 species of native mussels lived in Lake St. Clair, part of the waterway between Lake Huron and Lake Erie, in 1986. Two years later, zebra mussels spread into the lake. By 1997, all native mussels were gone except in a few shallow areas.

Invaders also pave the way for future intruders. The newcomers sometimes alter the habitat in ways that help other alien creatures thrive. For example, invasive gobies spread quickly in areas where zebra mussels have become established because the gobies eat the mussels. In other places, zebra mussels attach themselves to non-native Eurasian watermilfoil plants. The milfoil grows better because the clinging mussels filter and clear the water.

Invaders also pose human health risks, with scientists concerned pathogens could enter the United States by the same pathways invasive species use.

Commercial ships have been the main carriers of the invaders, which can ride in the water that empty ships carry as ballast and then dump as they take on cargo upon reaching harbor.

U.S. fish farms also contribute to the problem. Two kinds of Asian carp imported to clean U.S. fish farm ponds and tanks escaped into southern waterways in the early 1980s. They have spread up the Mississippi River and its tributaries toward Lake Michigan, jeopardizing a $4.5 billion commercial and recreational Great Lakes fishery.

Dennis Schornack, the co-chairman of the International Joint Commission that monitors Great Lakes programs, wants states to help fund a second electric barrier to keep the Asian carp from Lake Michigan.

However, Wisconsin Gov. Jim Doyle, incoming chairman of the Great Lakes Council of Governors, said the funding was clearly a federal responsibility, according to The Capital Times of Madison.

Schornack said Army Corps of Engineers funding for an improved electrical barrier in the Chicago Ship and Sanitary Canal to augment an experimental barrier built in 2001 is about $1.8 million short.

Two of 13 cables in the existing barrier already have dissolved, Schornack told The Capital Times. Another barrier is needed because electrodes in the existing barrier eventually will wear out and it must be shut down for maintenance.

Invasive species also have entered the lakes through bait buckets, as anglers intentionally or inadvertently dumped them into the water. Unwanted aquarium fish have been released into waterways because their owners thought it was a humane or convenient way to dispose them. About a third of the invasive species in the Great Lakes basin are aquatic plants, such as Eurasian watermilfoil, which have been spread by ships, boats, trailers, garden nurseries and other means. This vegetation can overtake lakes and interfere with boating, fishing and swimming.

The invasive species come with enormous costs. Zebra mussels, which look like thumbnail-sized clams with dark and light stripes, have cost industries, water companies and power plants nearly $2 billion, according to Chuck O'Neill, a coastal resources specialist with New York Sea Grant, an extension program of Cornell University and the State University of New York.

The invaders have spread beyond the Great Lakes, too.

That has hit home for Bob Franseen, who learned in October that Lake Ossawinnamakee in north-central Minnesota, had become infested with zebra mussels. The lake, where he lives year-round, is 110 miles from the nearest known zebra mussel infestation in Minnesota.

"The news came like a grenade tossed into the middle of things," Franseen said.

Ossawinnamakee is the second lake in Minnesota where zebra mussels have been found, after Lake Zumbro in the southeastern part of the state. Michigan has 185 infested lakes, Wisconsin has 44, and Ontario has dozens, especially along a highway of interconnected lakes, rivers and canals that extends more than 200 miles between lakes Ontario and Huron. The spread of invasive species in Ontario threatens a $1.4 billion-a-year recreational fishing industry.

Holding back the invasion isn't easy.

On ships, ballast water and residue in the tanks would need to be filtered or exposed to heat, chemicals, ultraviolet light, ozone or other treatment to kill unwanted creatures. Ship owners are unwilling to make such changes on their own because they say the technologies are experimental and government officials have not established limits for how many organisms need to be killed or removed.

In February, the International Maritime Organization, a U.N. agency, adopted a convention on ballast water that offers no immediate remedy. Ballast treatment standards would take effect for new ships in 2009 and for existing vessels beginning in 2014, if enough nations ratify the treaty.

Those regulations may be too late for the Great Lakes. Researchers have been calling for immediate action for the past 15 years.

For two years Congress has been studying whether to strengthen laws about invasive species. Two House subcommittees held a joint hearing in March, but it is unclear whether legislation will be passed.

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